

CLAIMS:

1. An antireflective coating composition useful with a photoresist composition comprising at least one base which is not soluble in a solvent of the photoresist composition.
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2. The antireflective coating composition of claim 1 wherein the base has a solubility of less than or equal to 0.2 wt. % in a solvent of the photoresist composition.
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3. The antireflective coating composition of claim 1 wherein the base has a solubility of less than or equal to 0.15 wt. % in a solvent of the photoresist composition.
- 15 4. The antireflective coating composition of claim 1 wherein the base has a solubility of less than or equal to 0.1 wt. % in a solvent of the photoresist composition.
5. The antireflective coating composition of claim 1 wherein only one base
20 which is not soluble in a solvent of the photoresist composition is present.
6. The antireflective coating composition of claim 1 wherein the base is present in an amount of from about 0.001 to about 15 wt % based on the solids of the antireflective coating composition.
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7. The antireflective coating composition of claim 6 wherein the base is present in an amount of from about 0.001 to about 10 wt % based on the solids of the antireflective coating composition.
- 30 8. The antireflective coating composition of claim 1 which further comprises at least one base which is soluble in a solvent of the photoresist composition.

9. The antireflective coating composition of claim 1 which further comprises one or more components selected from polymers, crosslinking materials, solvents, photoacid generators, dyes and surface active agents.

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10. The antireflective coating composition of claim 1 wherein at least one base which is not soluble in a solvent of the photoresist composition is selected from optionally substituted aminophylline, optionally substituted purine, optionally substituted 2,6-diaminopurine, optionally substituted 6-(dimethylamino)purine, optionally substituted xanthine, optionally substituted guanine, optionally substituted hypoxanthine, optionally substituted adenine, optionally substituted caffeine, optionally substituted theophylline, optionally substituted theobromine, optionally substituted pyrimidines, optionally substituted cytosine, optionally substituted cytosine, optionally substituted uracil, optionally substituted thymine, optionally substituted azapyridines, optionally substituted 4-benzimidazoles, optionally substituted 8-azaguanines, optionally substituted 2-hydroaminoazines, and mixtures thereof.

11. An antireflective coating composition useful with a photoresist composition comprising from about 0.001 to about 15 wt % based on the solids of the antireflective coating composition of at least one base which is not soluble in a solvent of the photoresist composition.

12. The antireflective coating composition of claim 11 comprising from about 0.001 to about 10 wt % based on the solids of the antireflective coating composition of at least one base which is not soluble in a solvent of the photoresist composition.

13. An antireflective coating composition useful with a photoresist composition comprising at least one base which has a solubility of less than or equal to 0.2 wt. % in a solvent of the photoresist composition.

14. The antireflective coating composition of claim 13 wherein the base has a solubility of less than or equal to 0.15 wt. % in a solvent of the photoresist composition.

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15. The antireflective coating composition of claim 13 wherein the base has a solubility of less than or equal to 0.1 wt. % in a solvent of the photoresist composition.

10 16. A multilayered structure comprising:

- (a) an antireflective coating formed from the antireflective coating composition of claim 1; and
- (b) a photoresist coating formed on top of said antireflective coating.

15 17. The multilayered structure of claim 14 wherein (a) the antireflective coating is first formed on a substrate.

18. The multilayered structure of claim 17 wherein (a) the antireflective coating is soft-baked prior to forming the photoresist coating on top thereof.

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19. The multilayered structure of claim 16 wherein the (a) antireflective coating is developable in an aqueous alkaline developer.

20. The multilayered structure of claim 16 wherein the (a) antireflective
25 coating is removable by dry etch.

21. The multilayered structure of claim 16 wherein for (a) the base has a solubility of less than or equal to 0.2 wt. % in a solvent of the photoresist composition.

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22. The multilayered structure of claim 16 wherein for (a) the base has a solubility of less than or equal to 0.15 wt. % in a solvent of the photoresist composition.

5 23. The multilayered structure of claim 16 wherein for (a) the base has a solubility of less than or equal to 0.1 wt. % in a solvent of the photoresist composition.

24. The multilayered structure of claim 16 wherein for (a) the base is present
10 in an amount of from about 0.001 to about 15 wt % based on the solids of the antireflective coating composition.

25. The multilayered structure of claim 24 wherein the base is present in an amount of from about 0.001 to about 10 wt % based on the solids of the
15 antireflective coating composition.

26. A multilayered structure comprising:

- (a) a substrate;
- (b) an antireflective coating formed from the antireflective coating
20 composition of claim 1 on top of said substrate; and
- (c) a photoresist coating formed on top of said antireflective coating.

27. The multilayered structure of claim 26 wherein for (b) the base has a solubility of less than or equal to 0.2 wt. % in a solvent of the photoresist
25 composition.

28. The multilayered structure of claim 26 wherein for (b) the base has a solubility of less than or equal to 0.15 wt. % in a solvent of the photoresist composition.

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29. The multilayered structure of claim 26 wherein for (b) the base has a solubility of less than or equal to 0.1 wt. % in a solvent of the photoresist composition.

5 30. The multilayered structure of claim 26 wherein for (a) the base is present in an amount of from about 0.001 to about 15 wt % based on the solids of the antireflective coating composition.

31. The multilayered structure of claim 30 wherein the base is present in an
10 amount of from about 0.001 to about 10 wt % based on the solids of the antireflective coating composition.

32. A method for forming an antireflective coating layer comprising the step of coating a substrate with the antireflective coating composition of claim 1.

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33. The method of claim 32 wherein for the antireflective coating composition, the base has a solubility of less than or equal to 0.2 wt. % in a solvent of the photoresist composition.

20 34. The method of claim 32 wherein for the antireflective coating composition, the base has a solubility of less than or equal to 0.15 wt. % in a solvent of the photoresist composition.

35. The method of claim 32 wherein for the antireflective coating composition,
25 the base has a solubility of less than or equal to 0.1 wt. % in a solvent of the photoresist composition.

36. The method of claim 32 wherein for (a) the base is present in an amount
of from about 0.001 to about 15 wt % based on the solids of the antireflective
30 coating composition.

37. The method of claim 36 wherein the base is present in an amount of from about 0.001 to about 10 wt % based on the solids of the antireflective coating composition.

- 5 38. A method of making a multilayered structure comprising:
- (a) applying the antireflective coating composition of claim 1 to a substrate;
 - (b) soft-baking the coating of step (a); and
 - (c) applying a photoresist composition to the coating of step (b).

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39. The method of claim 38 wherein the antireflective coating is developable in an aqueous alkaline developer.

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40. The method of claim 38 wherein the antireflective coating is removable by dry etch.

41. The method of claim 38 wherein for the antireflective coating composition, the base has a solubility of less than or equal to 0.2 wt. % in a solvent of the photoresist composition.

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42. The method of claim 38 wherein for the antireflective coating composition, the base has a solubility of less than or equal to 0.15 wt. % in a solvent of the photoresist composition.

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43. The method of claim 38 wherein for the antireflective coating composition, the base has a solubility of less than or equal to 0.1 wt. % in a solvent of the photoresist composition.

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44. The method of claim 38 wherein for (a) the base is present in an amount of from about 0.001 to about 15 wt % based on the solids of the antireflective coating composition.

45. The method of claim 44 wherein the base is present in an amount of from about 0.001 to about 10 wt % based on the solids of the antireflective coating composition.

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46. The method of claim 38 which further comprises the steps of

- (d) exposing the photoresist composition to actinic radiation; and
- (e) post-exposure baking the exposed coated wafer.